



A 1000 year mire wetness record from northern Scandinavia and its relation changes in the atmospheric circulation

kristian schoning (1) and Lena Barnekow (2)

(1) Swedish Geological Survey, Division of Applied Geology, Sweden, kristian.schoning@sgu.se, (2) Department of Earth and Ecosystem Sciences, Division of Geology, Lund University, Sweden

The surface wetness conditions in ombrotrophic mires is sensitive changes in precipitation and evapotranspiration and can thus be used as a record for changes in the water balance back in time. In this investigation we have tested the relationship between a testate amoebae derived mire surface wetness record and climatic parameters for a northern Swedish mire. Good agreement is achieved between the water table changes and to the large scale fluctuations of the atmospheric circulation patterns for the summer season in this case the Arctic Oscillation. We find that dry conditions in the mire are associated with negative phases in the summer index of the Arctic Oscillation. The mechanism behind this relationship is that a negative mode in the summer index of the Arctic Oscillation is characterized expressed by persistent high pressure conditions with mainly dry arctic air masses resulting in clear skies and reduced precipitation in the Northernmost part of Scandinavia. Thus the mire wetness in this area is related to a complex mixture of temperature, precipitation and cloudiness which to a large extent is controlled by the Arctic Oscillation making it difficult to distinguish single climatic parameters controlling the surface wetness. The major changes in the mire wetness recorded in this study during the past 1000 years suggests that major shifts have occurred in the atmospheric circulation during the past millennia resulting in dramatic changes in the terrestrial ecosystem. The most prominent change is recorded at AD 1450 where a major wet phase AD 1200-1450 rapidly turns into a mainly dry phase lasting until ca AD 1700, with the driest conditions around AD 1600. From AD 1700 mainly wet conditions prevailed until AD 1900 with a maximum at AD 1820. The wetness record in this mire suggests that conditions in the northern Scandinavia during the Medieval Warm Period were characterized by wet and cloudy conditions. This wet period was followed by a mainly dry and cool phase of the Little Ice Age characterized by negative summer index of the Arctic oscillation while the later part of the Little Ice Age shows wetter conditions.